ADVISORY DEPARTMENT
OF THE IMPERIAL COLLEGE OF
TROPICAL AGRICULTURE.

IMPERIAL MYCOLOGICAL
23 AUG. 1937
INSTITUTE

REPORT

OF THE

AGRICULTURAL DEPARTMENT

DOMINICA

1936.

ISSUED BY THE IMPERIAL COLLEGE OF TROPICAL AGRICULTURE

1937.

[Price Sixpence.]

PRINTED AT THE BULLETIN OFFICE, ROSEAU, DOMINICA, B.W.I.

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1936.

STAFF OF THE

AGRICULTURAL DEPARTMENT, DOMINICA

F. G. HARCOURT, M.B.E., F.R.H.S.	.. ..	Agricultural Superintendent and Curator, Botanic Gardens.
H. B. PIDDUCK, N.D A , N D.D., (HONS.)	.. ..	Assistant Agricultural Officer.
L. A. ROBERTS	.. ..	Clerk.
C. M. ALEXANDER	.. ..	Foreman.

GOVERNMENT FRUIT FARM, COPT HALL.

W. E. BASSETT	.. ..	Assistant Agricultural Officer.
G. J. STEDMAN	.. ..	Foreman, to 15th June.
A. C. WINSTON	.. ..	Foreman's Deputy from 16th June.

GOVERNMENT MARKETING DEPOT.

E. E. TAYLOR	.. ..	Officer-in-Charge and Chief Fruit Inspector to 27th April.
W. E. BASSETT	.. ..	Officer-in-Charge and Chief Fruit Inspector from 28th April.
G. A. WINSTON	.. ..	Clerk, to 26th October.
J. B. BULLY	.. ..	,, from 27th October.
J. J. MCDOWELL	. ..	Foreman and Fruit Inspector.

LETTER OF TRANSMITTAL.

C.A. 170/37.

16TH FEBRUARY, 1937.

SIR,

I have the honour to submit the Report of the Agricultural Department of Dominica for the year 1936.

2. No marked extremes in the condition of the weather, such as would cause serious setbacks to the progress of agricultural development, were experienced during the year. The total rainfall was above normal. but distribution was somewhat irregular. Unusually dry conditions were experienced in May and early June and on occasions during the rainy season torrential rains caused local flooding.

3. As anticipated at the end of 1935, exports of agricultural produce increased in 1936, the total value of the exports amounting to approximately 28 per cent more than the corresponding figure in 1935. There is every indication that there will be a further increase in production during 1937.

4. The production of limes and the exports of lime products have exceeded corresponding figures for the past two years owing to the arrival at a stage of production of budded lime plantations planted during the past ten years. Further progressive increases in production of limes may be expected during the next few years.

5. The banana industry has not made the rapid expansion anticipated. Difficulties of inland communication and high cost of transport, especially from the better banana areas of the Northern District, reduce profits to unattractive levels and are, in consequence, largely responsible for retarding the rate of expansion of the industry. It is, however, gratifying to record that a more adequate inspection and instruction service has been established for the better control of Panama disease and for encouraging the better cultivation and preparation of fruit for export.

6. A fair demand for Dominica oranges in Canada was continued during the year and exports increased appreciably. The seeded Triumph grapefruit, however, could find no remunerative market, except when shipped as grapefruit juice in small quantities, and as a result grapefruit exports declined. Exports of grapefruit should increase again in the near future when plantations of the Marsh seedless variety begin production.

7. The new market for coconuts which was being investigated in 1935 proved to be a very useful outlet, the number of nuts exported in 1936 being more than three times that of 1935. This outlet for nuts, together with the improved market price of copra, render the outlook for the coconut industry more encouraging.

8. Of the smaller industries, considerable development can be recorded in the export of mangoes and vanilla and in the production of bay oil. Exports of avocado pears have also increased, but more must be ascertained as to the suitability of varieties for cold storage transport before further expansion in this minor industry can be effected.

9. Work in the Experimental Station has been carried on satisfactorily. A portion of the Station formerly used as a plant nursery has been laid out in plots for the purpose of further investigating the influence of overhead shade in relation to the bearing qualities of lime trees in withertip disease areas.

10. The Botanic Gardens were maintained in an attractive condition and further improvements were effected.

11. Nursery work for the propagation of economic plants was considerably restricted in 1936 owing to the marked reduction in the amount of funds provided for this service. It is noted with satisfaction that funds have been provided for conducting this important and necessary work on a larger scale in 1937.

12. A very useful course in agricultural instruction and cost accounting was provided for pupils. The value of this course to the community should be reflected in time by a gradual improvement in the standard of agriculture practised by the smaller agriculturists as more and more trained pupils take up agriculture in the Presidency as a profession.

13. Progress in the development of the Fruit Farm at Copt Hall was slow, but much important work was undertaken which, it is hoped, will tend to accelerate the progress of development in the future. It was found possible to arrange for Professor F. Hardy of the Imperial College of Tropical Agriculture to make a short visit to the farm to investigate and report on soil requirements and manuring. As the result of his recommendations certain manurial experiments have been laid down and provisional adjustments made to the system of manuring. A closer spacing of fruit trees has been introduced by planting fillers between the older trees, and a more elaborate system of windbreaks has been instituted. Unfavourable weather conditions, especially excessively rainy conditions, hampered agricultural operations from time to time.

14. Mr. A. WIMBUSH, formerly Conservator of Forests, Madras, visited the Presidency to study the forestry problems. His report is reproduced in Appendix VI to this report.

15. For reasons of economy it was found necessary to dispense with the services of Mr. E. E. TAYLOR who had for a period of five years efficiently performed the duties of Officer-in-Charge of the Government Marketing Depot. In the re-organisation of the staff of the Department which followed, Mr. W. E. BASSETT assumed the management of both the Copt Hall Fruit Farm and the Government Marketing Depot. In spite of increased difficulties resulting from reduction in the staff, the Department has accomplished much useful work during the year.

I have the honour to be,

Sir,

Your obedient Servant,

G. A. JONES,
Commissioner of Agriculture.

His Honour,
The Administrator,
DOMINICA, B. W. I.

ANNUAL REPORT OF THE AGRICULTURAL DEPARTMENT, DOMINICA.

FOR THE YEAR ENDED 31st DECEMBER, 1936.

SECTION I.

AGRICULTURE IN THE PRESIDENCY.

1. WEATHER CONDITIONS.

THE past year was not on the whole a very favourable one as far as climatic conditions were concerned, for although no cyclones were experienced, high winds and excessive downpours of rain were much more frequent than usual. In the month of June in particular considerable damage was done to banana cultivations by gales, and rainfall in July exceeded all records since 1902. Throughout the rainy season deluges and thunderstorms were of frequent occurrence and river floods were responsible for considerable damage to roads and cultivations On the other hand, unusually dry periods were experienced, especially in May and early June when sections of the island suffered conditions approaching drought.

The total precipitation for 1936 at the Botanic Gardens was 89.26 inches being 15 inches in excess of the average for the past 20 years.

The usual tabular summaries of meteorological observations are given at the end of this report. The thanks of the department are extended to those planters who kindly co-operated and forwarded rainfall returns from various parts of the island.

2. AGRICULTURAL INDUSTRIES.

Limes.—A marked increase occurred in the production of lime products during 1936 and the exports, including green limes, when expressed as barrels of fruit show an increase of 8,612 barrels as compared with those of the previous year. This improvement is attributable to the increase in crop obtained from young budded lime trees which replaced the seedling lime trees destroyed by hurricanes or root disease a few years ago. Withertip disease was particularly active during the early part of the year and took an unusually heavy toll of early flushes of blossom, consequently the bulk of the lime crop set late in season. The destruction of trees and reduction in crop due to the attacks of root grubs or scale insects appeared to be less than in any recent year.

The local Treasury returns of lime products exported during 1936 were as follows :—

Product.	Quantity.	Estimated F. O. B. Value. £
Essential Oil (Distilled) .	9,189 lbs.	9,612
do. do. (Ecuelled) .	350 ,,	565
Oils in solution in Raw Juice exported ..	1,144 ,,	1,156
Green Limes	3,555 brls.	5,518
*Raw Lime Juice ..	88,460 gals.	3,686
Concentrated Lime Juice	2,783 ,,	198
Pickled Limes	140 brls.	352
		£21,087

*Includes all juice other than concentrated.

The market for green limes left much to be desired and owing to lateness of crop there was a big shortage in supplies when demand and prices were particularly good. By the time fruit became more plentiful the demand fell off and prices were low. Shipments show a decrease of 480 barrels as compared with those of the previous year. Arrangements previously agreed upon between shippers in Dominica and those of other West Indian islands for ceasing to ship green limes on consignment and to adopt a system of outright sales at minimum f.o.b. prices was not generally adhered to, and it is felt by Dominica shippers that this failure to co-operate was in a measure responsible for adversely affecting the prices for green limes. The demand for distilled lime oil and raw juice remained steady with prices satisfactory to shippers and a marked increase occurred in shipments of these two products.

The total exports of lime products expressed in barrels of fruit amounted to 36,825 barrels in 1936 as against 28,213 barrels in the previous year. These figures do not necessarily indicate annual production as there is usually a carry-over of products at the end of a calendar year.

The following table shows the quantities of each product actually exported in 1936 calculated as barrels of fruit.

Product.	Barrels of fruit.	Approximate percentage of exports.
Distilled Lime Oil ..	26,517	72.00
Ecuelled Lime Oil ..	2,800	7.60
"Oils in Solution" ..	3,813	10.36
Green Limes	3,555	9.66
Pickled Limes	140	.38
	Total .. 36,825	

The conversion table is as follows:—

Ecuelled Oil (lbs.) multiplied by 8 equals barrels of fruit ecuelled.

Total distilled oil (lbs.), minus total ecuelled oil (lbs.), multiplied by 3 equals barrels of fruit unecuelled.

Oils (lbs.) in solution in raw lime juice multiplied by 3½ equals barrels of fruit.

For the purpose of comparison with former years, the following table gives the crop expressed in round numbers and shipped annually since 1919.

Years.	*Barrels.*	*Remarks.*
1919/22 (average) ..	422,000	
1923/26 (,,) ..	274,000	Decline in production
1927/30 (,,) ..	165,000	due to withertip disease,
1931 (actual) ..	68,000	hurricane damage and
1932 (,,) ..	48,000	root diseases.
1933 (,,) ..	36,000	
1934 (,,) ..	27,000	
1935 (,,) ..	28,000	
1936 (,,) ..	37,000	

The area at present planted in budded limes is estimated to be 1,500 acres. Prior to the appearance of withertip disease in 1922 it was estimated that there were 5,000 acres of seedling limes in Dominica.

Bananas.—Considerable impetus having been given to this industry through the Canadian Banana Co. Ltd. contracting to purchase all marketable Gros Michel bananas of seven hands and upwards, production has shown a progressive increase. The following table shows the total quantities exported during the past five years :—

1932	..	9,019 bunches,	valued at £423 locally.
1933	..	22,304 ,, , ;,	,, £889 ,,
1934	..	37,850 ,, , ,,	,, £3,253 f.o.b.
1935	..	71,527 ,, , ,,	,, £5,780 ,,
1936	..	99,858 ,, , ,,	,, £8,391 ,,

The figures for 1936 are not as high as was generally expected for there are several factors militating against the expansion of this industry in Dominica, notable among which are difficulties of transport and inland communication ; variation in the quality of fruit acceptable for export ; and the small margin of profit, if any, accruing to growers whose lands are far distant from Roseau, the only port of shipment. Representations made to the shipping company to make Portsmouth a port of call have so far not met with success and this is also retarding considerably the expansion of the industry in the Northern District of Dominica, which contains some of the best banana lands in the island.

In view of the apprehension felt concerning the incidence of Panama Disease, arrangements were made for the well-known authority on banana diseases, Dr. Wardlaw of the Imperial College of Tropical Agriculture, to visit Dominica and examine and determine the status of this disease in relation to the commercial prospects of the industry. The recommendations contained in his report which is republished as an appendix to this report have been put into effect.

The situation in regard to Banana borer which is responsible for fairly heavy losses remains virtually unchanged, since most growers seem loth to incur expenditure on controlling this pest. All adverse factors affecting the industry are receiving the close attention of the Government and of the Dominica Banana Association and every effort is being made locally to foster the industry and to build it up on sound lines for the benefit of the producer.

Oranges.—Interest in this industry is being well maintained and exports show an increase of 1,864 crates and 72 barrels as compared with those of the previous year. Excepting for the earlier shipments of Navels, prices were at a slightly lower level than in 1935 owing to the congested state of the market in Canada during the later months of the year. The inter-colonial trade in oranges is catered for by shipments packed in barrels. Exports for the year amounted to 8,818 crates and 1,968 barrels.

Grapefruit.—The prospects of this industry appear anything but bright and it was found impossible to market the seeded Triumph variety without loss, except in the case of small shipments of early fruit. The Marsh variety which contains but few seeds was in fair demand but prices were generally low owing to overstocked markets. An order for grapefruit juice eased the situation to some extent and it is to be hoped that it may be possible to extend this outlet for the juice from seeded varieties. Exports for 1936 amounted to 3,038 crates, a decrease of 2,348 crates as compared with the previous year.

Mangoes.—A big increase occurred in the shipments of mangoes, particularly of the Julie variety, and returns were satisfactory on the whole. The total exports amounted to 8,616 boxes as compared with 3,462 boxes exported in 1935.

Avocado Pears.—The exports of this fruit also showed a considerable increase, 5,158 boxes being exported as compared with 3,726 during the previous year, and prices were remunerative to shippers.

The fruit trade is more fully reviewed in this report under the heading of Government Marketing Depot.

Coconuts.—New life has been given to the coconut industry through an improvement in the price of copra and the co-operation of coconut growers in the Northern District in developing an export trade in dry nuts. Despite an over threefold increase in the export of coconuts, the output of copra has been maintained at about the same level as in the previous year. The comparative figures are 230,170 coconuts and 278,793 lbs. of copra for 1935 and 719,554 coconuts and 273,612 lbs. of copra in 1936.

Cocoa.—An improvement in the price for this product has resulted in most growers paying greater attention to cultivations which, during the period of price depression, were barely maintained and often neglected. The unusually wet weather which followed the main flowering period was responsible for heavy losses through "black pod" rot. Exports amounted to 354,578 lbs.—an increase of over 10,000 lbs.

Bay Oil.—This industry has been well maintained and an improvement in price resulted in an increase in the quantity exported. The preparation and export of bay rum which is a comparatively new industry is also making headway. Exports of bay oil totalled 21,282 lbs. and of bay rum 963 gallons.

Vanilla.—The demand for this product showed sudden improvement and prices were much better than have been obtained for a number of years. Consequently there has been a marked revival of interest in this crop, particularly amongst the peasantry. Exports amounted to 4,341 lbs. which is 3,732 lbs. greater than during the previous year.

Rum.—The promotion of this industry in other parts of the Colony to which Dominica rum was previously exported continues adversely to affect production and export of this product. Only six distilleries operated in 1936 and most of the rum exported was from stocks which had accumulated. The growing of sugar-cane for the purpose of rum making is now almost entirely in the hands of a few peasants or tenants, but the local price of syrup was maintained through there being a greatly decreased area under this crop. Exports of rum were 3,090 gallons which is 7,089 gallons less than in 1935.

Tobacco.—Interest in this crop and the production of tobacco products, principally for sale locally, is displayed by one large estate. Pipe tobacco, cigars and cigarettes are made and also exported in small quantities.

Coffee.—Coffee growing is chiefly a peasant industry which caters for the local demands for this product.

Vetiver.—The possibility of a remunerative market for the dried roots of Vetiver or Cus-Cus grass is being explored and samples which were forwarded to the Imperial Institute for examination have been very favourably reported upon. (See appendix.) A large commercial sample of this product has been shipped to the London market on the recommendation of the Imperial Institute.

3. TABLE OF EXPORTS FROM DOMINICA FOR THE TRIENNIAL PERIOD 1934 TO 1936.

	1934.		1935.		1936.	
	Quantity.	F.O.B. Value. £	Quantity.	F.O.B. Value. £	Quantity.	Local Value. £
Lime Products:						
Concentrated Juice ...	7,462 gals.	273	3,372 gals.	184	2,783 gals.	198
Raw Juice	74,908 ,,	4,523	48,074 ,,	2,002	88,460 ,,	3,686
Lime Juice Cordial ...	113 ,,	28	—	—	—	—
Distilled Oil	6,288 lbs.	6,418	7,127 lbs.	7,443	9,189 lbs.	9,612
Ecuelled Oil	245 ,,	393	140 ,,	186	350 ,,	565
Oils in Solution ..	936 ,,	952	567 ,,	589	1,144 ,,	1,156
Green Limes	3,790 brls.	4,598	4,035 brls.	6,123	3,555 brls.	5,518
Pickled Limes	94 ,,	117	207 ,,	474	140 ,,	352
Other Fruits and Allied Products:						
Oranges	9,651 crates	4,324	10,746 crates	5,773	12,754 crates	7,319
Orange Oil	482 lbs.	98	1,131 lbs.	235	70 lbs.	14
Grapefruit	3,167 crates	1,403	5,386 crates	2,596	3,038 crates	1,586
Grapefruit Juice ..	—	—	329 gals.	31	2,143 gals.	199
Bananas	37,850 bunches	3,253	71,527 bunches	5,780	99,858 bunches	8,391
Mangoes	4,084 crates	1,225	3,462 crates	1,363	8,616 crates	3,164
Avocado Pears... ...	4,344 ,,	838	3,726 ,,	744	5,158 ,,	1,171
Miscellaneous		81		224		249
Cocoa Products:						
Cocoa, Raw	324,333 lbs.	2,983	344,156 lbs.	3,459	354,578 lbs.	4,168
Cocoa, Prepared ...	2,087 ,,	26	1,032 ,,	15	1,161 ,,	25
Coconut Products:						
Copra	247,508 lbs.	836	278,793 lbs.	1,066	273,612 lbs.	1,497
Coconuts	103,639	249	230,170	452	719,554	1,991
Sugar Products:						
Rum	17,521 gals.	2,281	10,179 gals.	1,428	3,090 gals.	424
Bay Products:						
Bay Oil	14,988 lbs.	2,206	16,474 lbs.	2,421	21,282 lbs.	3,229
Bay Rum	549 gals.	104	516 gals.	92	963 gals.	168
Spices:						
Vanilla	797 lbs.	109	609 lbs.	153	4,341 lbs.	868
Nutmegs		6		6	310 ,,	7
Ginger		4		9	2,094 ,,	25
Other Products:						
Coffee	1,553 lbs.	53	859 lbs.	22	728 lbs.	14
Vegetables		115		35		56
Farine		30		14		6
Hides and Skins ...		7		1		—
Leather, Unmanufac/d		42		63	2,284 lbs.	92
Turtle Shells		—		26	127 ,,	45
Baskets		5		11		10
Tobacco, Cigars & Cigarettes	13,252 lbs.	1,109	6,568 lbs.	495	3,156 lbs.	200
Miscellaneous		80		352		200
Forest Products:						
Hardwood	108,466 ft.	965	95,407 ft.	537	131,638 ft.	710
Firewood	95 cords	34	46 cords	10	192 cords	71
Canoe Shells		32	7	7	14	28
Shingles		3		2		—
Charcoal		77		12		23
Locally made boats ...		235		456	158	632
Value of Local Exports ...		40,115		44,891		57,669
Total Re-Exports ...		12,913		12,595		12,300
Value of Total Exports ...		£53,028		£57,486		£69,969

NOTE. 1. Various sized packages are used in the export of fruit and exports given above are converted to the most common pack.

2. The areas under various crops cannot be given owing to a preponderance of peasant holdings and numerous small estates having no pure stand of any one crop.

SECTION II.

WORK OF THE DEPARTMENT.

1. THE BOTANIC GARDENS.

THE Botanic Gardens, which cover an area of approximately 44 acres, have almost recovered from the devastating effects of the hurricanes of 1926, 1928 and 1930, and in most respects their beauty has been considerably enhanced by improvements made during the process of their resuscitation.

Decorative Section.—This section of the Gardens was maintained in good condition throughout the year and continues to attract large numbers of visitors. Cricket pitches were provided on the main lawn during the season as usual. The dry weather experienced in May and June necessitated considerable attention being given to the nursing of young specimen trees and palms which, since the advent of the rainy season, have made particularly good growth.

In addition to the ordinary routine work consisting principally of the care of lawns, trees and hedges, a number of improvements were effected. The main drive which was macadamised last year was given a sealing coat of oil and sections of roads leading to the Office and to the Windsor Park gate were macadamised and oiled.

The policy of replacing old, unsightly, or otherwise unsuitable specimens by planting replicates and new introductions was continued, care being taken not to interfere with the large stretches of lawn or the grass drives which are such a feature of the Gardens. Special attention was given to the southern end of the Gardens, including the establishment of hedges to replace picket fences which are in bad condition. A large circular bed of fully-grown palms near the Windsor Park gate was struck by lightning and as the largest palms in this group were killed and others damaged, it was decided to clear this bed, turf it and select a nearby site for a similar collection. A circular bed of 40 feet in diameter was prepared and planted with forty-three young palms representing ten different species. Additions were also made to the decorative borders bounding with the Economic Section.

The Memorial Park, Library Gardens, Morne Bruce Lands and Old Military Cemetery, which are attached to the department for upkeep, were maintained in as good condition as funds permitted.

Economic Section.—The remodelling of this section of the Gardens was continued, but the work is of necessity slow as no special funds are provided for the purpose. Most of the fairly level land having been remodelled and vacant plots replanted, attention was again given to hillside lands which contained principally old cacao trees irregularly interplanted with other plants of a miscellaneous nature. These plantings had become patchy and uneconomic owing to the damage they received from hurricanes.

The plants of selected cacao and grafted mangoes planted in Hillside Plot 1 in 1935 on the whole made satisfactory growth, but a few trees died during the dry season and were replaced. Bananas planted as a catch crop also grew well and commenced fruiting.

The Pimento plants in Hillside Plot 2 have made good progress and some of the older plants have flowered.

Part of another hillside plot numbered H. S. 3 was cleared of old cacao trees and replanted with varieties selected by Officers of the Cacao Research Scheme, Trinidad. Contour drains were made and rows of lemon grass planted midway between the rows of young cacao to prevent excessive soil wash. *Gliricidia sepium* and *Crotalaria spp.* were planted for shade or ground cover. The upper slope of plot 19 was also similarly dealt with.

The demonstration plots on level ground were maintained in good order and condition. The collection of orange, grapefruit and avocado pear varieties in plots 1 A. B. C and D produced a fair crop of fruit considering their age, but the trees are at present too young to give a reliable indication of any variation in their cropping season, which is an object of this trial.

The specially selected cacao varieties planted in plots 3 and 13 have made particularly good growth. Outbreaks of Panama Disease having occurred in the Gros Michel bananas planted in these plots as a catch crop and to provide temporary shade, the diseased plants were destroyed and replaced by Cocoyes (*Musa sp.*)

Tonka beans and coffee varieties planted in plots 8 and 15 are making very slow growth but appear to be established.

Recent plantings in other plots, as outlined in previous reports, made good progress.

The usual routine work was carried out throughout the section and the following legumes were extensively used as cover crops : *Indigofera endecaphylla, Tephrosia candida, Crotalaria vasculosa, C. valetonii, C. sericea* and *Cannavalia ensiformis.*

Costings were kept for each plot in order to facilitate economical working, to show the cost of various cultural operations, and later, to provide statistical information as to the cost of bringing crops into bearing.

Nursery.—A small pot nursery is maintained for the propagation of plants of general or scientific interest, chiefly to meet the needs of the Botanic Gardens, and a small surplus of plants is available for sale or exchange. The shelter of this nursery having been blown down, a new one was built and the layout of the nursery remodelled.

Plant and Seed Exchange.—Contributors of planting material included His Honour the Administrator, the Rev. Father Remaud, L. P. Napier, Esq., and S. Haweis, Esq.. of Dominica ; the Agricultural Departments of St. Lucia and New Guinea ; Dr. David Fairchild, Florida ; the Commissioner of Agriculture, Trinidad ; the Canal Zone Experiment Station, Panama ; D. M. Jackman, Esq., of New York ; Miss Janet Clarke of Canada ; and the Coconut Grove Palmetum, Florida. Satisfactory results were obtained with most of the plants and seeds kindly contributed which, in addition to economic species, included palms and other ornamentals.

Recipients of plants or seeds of ornamental species included Lady Lethem, Antigua ; His Honour the Administrator, Dominica ; Dr. David Fairchild, Florida ; Miss M. L. Davidson, U. S. A. ; and M. Beauvarlet, Guadeloupe. Plants or seeds of newly introduced economic strains were also distributed locally for trial on estates.

Repairs to Buildings, etc.—The entire wall forming the western boundary of the Gardens was put in thorough repair, a section of the eastern boundary wall reconstructed, and a new large double folding gate was made, and hung at the main entrance. The garden fixtures and benches were painted and minor repairs effected where necessary. Some of the barbed-wire fences were re-wired and supplied with new posts. The glass houses used for plant propagation were repaired and a new fumigatorium was erected by the Public Works Department.

2. PLANT DISTRIBUTION.

The funds provided for the propagation of economic plants were reduced to £300 in 1936, less than one-third of the amount annually expended in recent years, and in consequence it was not possible to maintain nurseries on as large a scale as formerly. The area devoted to this work at the beginning of the year was approximately 6 acres, which included several plots of land in the Experiment Station, since utilised for other purposes. Several sections of this area were allowed to lie fallow and at the end of the year the area operated was approximately 3½ acres. In anticipation, however, of increased funds being made available for extending nursery work, sowings of seeds for the purpose of providing rootstocks for budding or grafting in 1938 have been doubled.

Most unfavourable weather for citrus propagation was experienced during the greater part of the year. In the severe dry season which extended well into June, seedlings and budded plants of all ages suffered, even in sections where irrigation was possible, and heavy losses occurred amongst young stocks, particularly those in seed beds. All nursery plants received a set back and were further adversely affected by excessive rains which fell between July and the end of the year. Actual losses of stocks of budding age were not great, but considerable damping off of young plants occurred in seed beds.

The demand for lime trees was in excess of the numbers available for distribution and the nurseries were completely cleared of these plants by the end of the year. Young trees of orange and grapefruit varieties, which require special training, were propagated in sufficient numbers to meet anticipated demands, but owing to slowness of growth due to unfavourable weather, orders could not be met in full and numbers of half-grown plants remained on hand at the end of the year.

The growth of stocks for budding and distribution in 1937 was also disappointingly slow and it was not possible to commence budding until three months later than usual. It is anticipated, however, that orders placed in advance will be met during the coming season.

Pests and diseases were more in evidence than usual, particularly scale insects, but no uncontrollable epidemics occurred. The usual routine control for nursery troubles had to be carried out more extensively and the Imperial College of Tropical Agriculture were consulted on the problems which arose.

The demand for grafted and budded plants of mangoes, pears and cacao was slow, and negligible for coffee. Late in the year there were several enquiries for cacao and nutmegs for supply in 1937.

Seeds and cuttings of cover crops and mulch plants were also in small demand, since planters have now had ample opportunity of establishing their own sources of supply.

Onion and Cauliflower seed was distributed as usual.

Expenditure on nursery work and plant distribution in 1936 amounted to £299. 18. 7 and receipts for plants sold to £229. 12. 10, including the collection of outstanding debts.

The following tables show the variety and numbers of plants annually distributed during the past three years and totals since the commencement of the Plant Distribution Scheme in 1927.

Budded or Grafted Fruit Trees.

Name of Plant.	*Total for 7 years 1927–33.*	*Total for 1934.*	*Total for 1935.*	*Total for 1936.*	*Total for 10 years 1927–36.*
Washington Navel Orange	8,729	2,505	1,103	1,767	14.104
*Oranges (Other)	2,029	2,110	2,391	679	7,209
†Grapefruit	25,297	4,291	4,334	796	34,718
Portugal Orange	197	36	21	25	279
Mandarin	272	44	16	25	357
Sweet Lime	199	18	23	21	261
Tangerine	359	42	26	34	461
West Indian Limes	113,186	9,556	9,194	3,928	135,864
Limes (Other varieties)	5,359	248	269	412	6,288
Lemons	4,054	35	—	—	4,089
Avocado Pears	196	143	120	27	486
Mangoes	1,393	108	140	94	1,735
	161,270	19,136	17,637	7,808	205,851

*Principally "Valencia."
†Chiefly "Marsh."

Other Economic Plants

Name of Plant.	*Total for 7 years 1927–33.*	*Total for 1934.*	*Total for 1935.*	*Total for 1936.*	*Total for 10 years 1927–36.*
Seedling Limes	41,720	—	—	—	41,720
Sour Orange	29,536	1,162	824	—	31,522
Coconuts	33,004	—	—	—	33,004
Cocoa	47,491	1,093	204	647	49,435
Coffee	126,357	3,272	1,447	6	131,082
Seedling Mangoes	256	—	—	—	256
Nutmeg	12,207	262	125	1	12,595
Tobacco	6,382	—	—	—	6,382
Mongosteen	360	—	26	—	386
Seedling Avocado Pears	315	6	—	—	321
Papaw	2,424	5	—	—	2,429
Tannias	31,670	—	—	—	31,670
Camphor	363	—	—	—	363
Black Pepper	832	205	30	—	1,067
Onions	54,637	—	—	—	54,637
Bananas	—	4,896	612	—	5,508
Sugar Cane Cuttings	26,643	—	—	—	26,643
‡Miscellaneous	64,930	10,484	1,679	404	77,497
	479,127	21,385	4,947	1,058	506,517

‡Includes cuttings and plants for cover crop and mulch purposes.

3. EXPERIMENT STATION.

In these trials grounds, plots of permanent crops, principally limes, are mainly laid out for demonstration purposes and the young budded lime trees planted in 1929 and subsequently, to demonstrate the value of good cultural methods have made rapid growth and are giving particularly good crops for plants of their age.

The crop from old trees in plot 4 was less than in the previous year, and the increases in yields from plots of young trees were not as marked as previously. This was in the main attributable to unusually severe attacks of the "withertip" and "blossom blight" fungus, *Gloeosporium limetticolum*, which took heavy toll of the early flushes of flowers. Consequently the main crop came in much later than usual and the bulk of the fruit was gathered in the last quarter of the year.

For the purpose of facilitating economical working and later, to provide statistical information as to the costs of lime production, detailed costings are being kept for each individual plot. Records are also kept of manurial treatments The lime trees in all plots receive applications of fish manure and sulphate of ammonia in the proportion of approximately 3:1 in gradually increasing doses as they develop; half the fish manure and all the sulphate of ammonia being applied during May and June, and the balance of the former in November and December.

All plots are contour-drained and lemon grass planted above the drains to minimise soil wash and form support for terracing. Steep hillsides are planted in lemon grass and gliricidia to provide material for mulching. The majority of the plots are cover-cropped with *Tephrosia candida*, either completely or in belts to form temporary windbreaks. During the year the permanent windbreaks of Pois Doux (*Inga laurina*) at the head of the valley in which the lime plots are situated were strengthened, and rows of Galba (*Calophyllum Calaba*) were planted to protect plots 2 and 7.

Trials of Stocks for Limes.—Three plots—Nos. 1, 2 and 3—are each divided into three sections to provide a triplicate series of rootstock trials for budded limes and the stocks used are sour orange, grapefruit and rough lemon. The trees were planted in 1930 and number 77 in each group of three stocks, covering an area of approximately eight-tenths of an acre for each series and 2.414 acres in all. The yields recorded are as follows:—

Plots 1, 2 & 3. Yields to the nearest Half-Barrel.

	Rough Lemon 1A, 2A, 3A.	Grapefruit. 1B, 2B, 3B.	Sour Orange. 1C, 2C, 3C.	Totals.
1932	0½	1	1	2½
1933	6	10	6	22
1934	15½	18½	16	50
1935	48	53	47	148
1936	72½	87	67½	227
Total, 5 years:	142½	169½	137½	449½

Old Budded Lime Trees.—There are two plots. Nos. 4 and 5, of limes budded on sour orange stock which are now twenty-three years old. In 1921–22 the combined yield of these plots approximated 241 barrels of fruit per acre, but a gradual reduction in yield followed the appearance of withertip disease in 1922 which was accentuated by damage done to the trees by the hurricanes of 1926, 1928 and 1930. The effect of this damage is still evident, but most of the trees have made fair recovery and yields are still profitable. Plot 5 suffered most but has the advantage of a deeper soil and a gentle slope. During the year a few trees died in each plot and the pickets were replanted.

The calculated yields per acre for the past five years were as follows:—

Plot No.	*1932.*	*1933.*	*1934.*	*1935.*	*1936.*
4	113 brls.	79 brls.	121 brls.	155 brls.	147 brls.
5	182 ,,	86 ,,	123 ,,	200 ,,	225 ,,

Budded versus Grafted Limes.—Plot No. 6 is divided into two sections, one section being planted in grafted limes and the other in budded limes, sour orange being the stock used in both cases. The trees were planted in 1929 and the grafted trees have consistently given the higher yields. Yields in 1936 from the grafted trees were at the rate of 132 barrels per acre and from the budded trees 69 barrels per acre, as compared with 114 and 59 barrels respectively in 1935.

Other Plots of Budded Limes.—Plots 7–11 containing limes on sour orange stock were planted in 1930–31 and the trees are bearing good crops for their age. They serve to demonstrate methods of cultivation as applied to hilly land of various gradients and with trees planted at different distances apart. The actual yields recorded in the past three years were 43, 226 and 302 barrels from an area of over six acres.

Shade Trials for Limes.—In view of the diversity of opinion which exists concerning the influence of overhead shade in relation to the bearing qualities of lime trees in withertip disease areas, plot No. 18 formerly used as a citrus nursery was selected and planted with limes on the sour orange stock for observation purposes in this connection. This plot, which has an area of 1.46 acres, was divided into four sections. Two sections were planted with the following shade trees: *Adenanthera pavonina* in 18A and *Peltophorum ferrugineum* and *Cassia Siamea* alternately in 18C. The lime trees in the remaining two sections are being grown without shade for the purpose of comparison. Costings are being kept.

Top-working of Grapefruit Trees with Limes.—This trial was decided upon in view of the indications given by plots 1, 2 and 3 that the lime budded on grapefruit gives a heavier yield than on other root-stocks and also produces trees of dwarfer growth and more spreading habit, which is a definite advantage for the picking of green limes. The longevity of the lime on the grapefruit stock, however, being uncertain owing to the susceptibility of this stock to gummosis, it is hoped to ascertain whether the desirable characteristics aforementioned can be combined with those of a root-stock having greater powers of resistance to hurricanes and disease. With this object in view, nursery plants of fully seeded varieties of grapefruit budded on sour orange stock were top-worked with limes and fifty-five of these trees were planted in plot 9C formerly used for raising citrus plants and later as a banana nursery.

Top-working of Lime Trees with Grapefruit.—Several of the budded lime trees on the sour orange stock which were successfully top-worked with grapefruit have borne a few fruits and those on rough lemon and grapefruit stocks which were later similarly treated have made satisfactory growth. Plot 8B contains sixteen trees, eight on rough lemon and eight on grapefruit stock and plot 9A, 34 trees on sour orange stock. All failures have been removed and the pickets replanted with well-grown nursery plants of Marsh grapefruit on the appropriate rootstock. So far there does not appear to be any marked form of incompatibility between the lime and the grapefruit.

Grapefruit.—The crop from plots 12A and 12B containing grapefruit varieties planted in 1914–15 matured during the period January to May, and was sold at prices averaging 4/- per 100. The total area of these plots is .54 acres and the yield of saleable fruit was at the rate of 272 crates per acre, or 2.6 crates per tree. The treatment for gummosis given last year, including the application of lime, has improved the general health of the trees. Heavy pruning, however, was held to be responsible for a somewhat reduced crop.

4. PESTS & DISEASES.

Panama Disease (*Fusarium cubense.*)—In view of the general incidence of this disease in banana cultivations throughout the island, a special inspection service was inaugurated in February by the appointment of three inspectors whose chief duty was to continue the work of demonstrating to planters and peasants the use of gas oil for the destruction of plants attacked by Panama Disease. These inspectors operated the chief producing areas in the northern, leeward coastal and southern districts, but it was felt doubtful if these measures were adequate to deal with the situation. It was therefore arranged that Dr. C. W. Wardlaw of the Imperial College of Tropical Agriculture should visit Dominica in May to examine the status of this disease in relation to the commercial prospects of the banana industry and to make recommendations. His report is published as Appendix IV to this report.

Dr. Wardlaw's recommendations were adopted in their entirety in June and funds were provided for the appointment of four additional inspectors who, together with the original three, now operate all the banana producing areas of the island. In addition to

disease control work, they give demonstrations and advice on all phases of the cultivation and handling of bananas.

The following table computed from the inspectors' reports shows the estimated average monthly incidence of Panama disease in plots inspected during the latter half of the year :—

District.	*Plots Inspected.*	*Plots Infected.*	*Percentage Infected.*	*Stools Inspected.*	*Stools Infected.*	*Percentage Infected.*
1. Marigot ..	103	18	17	11,878	51	.42
2. Lasoye	46	16	35	8,827	158	1.79
3. Portsmouth ..	40	18	45	5,638	101	1.79
4. Colihaut ..	33	8	24	7,203	45	.62
5. St. Joseph ..	71	16	22	4,804	75	1.56
6. Roseau	166	40	24	20,905	441	2.11
7. South & S. E. ..	58	25	43	10,522	234	2.22
ALL DISTRICTS..	486	140	29	69,777	1,106	1.58

For the purpose of supervision periodical visits were paid to the inspectors in their districts by officers of the department. In addition, the inspectors appointed for the Lasoye and Southern districts were given seniority in order to assist with the work of supervision and to act generally as travelling agricultural instructors among the small-holders and peasants.

Under Plants Protection Ordinance No. 2 of 1927 notices were served on the occupiers of plots containing more than 10% diseased banana stools, forbidding them to remove planting material from affected areas. Seventy-four small areas have so far been quarantined and their sites plotted on a map for departmental reference.

Bacterial Wilt (*Bacterium solanacearum*).—This disease, hitherto only observed in Cocoyes, was found in several localities attacking Gros Michel bananas. Its effects, though less acute than those of Panama Disease, are of a similar nature and growers were advised to adopt the same measures of control.

Banana Borer (*Cosmopolites sordidus*).—Many banana growers do not take this insidious pest as seriously as they should and consequently in cultivations several years old, the reduction in crop in certain cases is nearly as serious as that caused by Panama disease.

The borers are present in most banana cultivations and regular trapping and field sanitation are being advocated, these methods having proved successful in the department. Peasants are being discouraged from growing sweet potatoes as a catch crop for bananas.

Citrus Root Grubs (*Diaprepes spp. etc.*).—Damage observed to be occasioned by the larvae of these beetles appeared to be only slight and spasmodic, and defoliation of trees by adults appeared to be less than in any recent year. On one estate during very dry weather the beetles were observed to be eating the rinds of freshly set lime fruits and caused a fair amount of damage. The attack abated on the coming of rains and in consequence spraying with insecticides recommended by the authorities of the Imperial College of Tropical Agriculture was not resorted to.

Withertip Disease (*Gloeosporum limetticolum*).—The efforts made to raise a hybrid lime highly resistant to this disease yet possessing the properties of the West Indian lime were continued. During the year seedlings from back-crosses of selected lime hybrids of high resistance were raised and transplanted into beds. Those trees of the original hybrids and some of the first back-crosses which showed no particular promise have been destroyed. The remainder have been retained for further observation.

5. AGRICULTURAL INSTRUCTION AND ADVISORY WORK.

Pupils.—The number of youths, mostly recruited from the country districts to undergo general training in agriculture, averaged twelve, and at the end of the year only four of the 1935 pupils remained in training. The chief reasons for this reduction were the appointment of several senior pupils as banana inspectors and the retirement of two others to take up positions on estates. Several of the pupils who were specially trained and appointed as banana inspectors were previously carrying out responsible duties in the department and those next in seniority were detailed for filling the vacancies created.

In spite of these changes, it was found possible to arrange for the pupils to carry out most of the skilled labour in the nurseries, and also for them to take part to a much greater extent than formerly in the general outdoor work of the department. This naturally called for constant supervision on the part of the staff and overseers.

So keen was the competition for vacant pupilships that a large number of applicants had to be refused admission for financial reasons, but seven of them were accepted as unpaid probationers.

All pupils and probationers attend lectures and demonstrations on Saturdays and on other occasions as circumstances permit. Whenever possible, practical work in the field is given as a basis for theory taught in the class room. The crop records and cost accounts of the department, both at headquarters and at the Government Fruit Farm, together with the statistics derived therefrom, are kept by the senior pupils, under supervision.

The following is the syllabus of the theoretical work, which is spread over a period of two years :—

JUNIOR PUPILS (1ST. YEAR.)

In addition to attending some of the lectures and demonstrations in the Senior Course:—

Agricultural Botany—the study of plants and their functions in relation to agriculture. Only economic plants and pernicious weeds are studied in detail.

Agricultural Science—chiefly the simple reactions of manures, soils and insecticides. Simple meteorology.

SENIOR PUPILS (2ND. YEAR.)

General Agriculture—propagation, planting, maintenance and crop disposal of limes, other citrus, cocoa, bananas, etc.; together with various forms of crop and soil improvement.

Pests and Diseases—their prevention and control.

Agricultural Economics—based largely on actual costings and crop returns of the department.

Pupils are required to write a summary of all lectures and demonstrations thereby providing themselves with useful notes for future reference. Their lectures are given and note books corrected by the Assistant Agricultural Officer, who is responsible for their training.

Grammar School Boys.—In conjunction with a course of theoretical agricultural science given in school, boys of the upper forms of the Grammar School attended at the department fortnightly during school term and were instructed in practical operations. Demonstrations were first given in the experimental plots and were followed by notes in the class room on the principles underlying the various operations. It is hoped in this way to induce a larger number of these boys ultimately to take up agriculture as a profession, either on their own properties or as settlers at the Government Fruit Farm.

Banana Inspectors.—During the year, selected senior pupils and ex-pupils were given special instruction in banana growing in all its phases, with special reference to Panama disease control work, prior to their appointment as inspectors. The inspectors included four ex-pupils already employed in the department and three senior pupils still in training. The courses extended over a period of one month.

Instruction in Country Districts.—The post of Travelling Agricultural Instructor was abolished at the end of last year and agricultural instruction among the peasants was continued by the senior inspectors Although the duties of these inspectors in relation to banana disease control work are alone sufficiently exacting, they have been able in the course of their travels to advise on the cultivation of other crops and to visit school gardens.

Advisory Work.—The senior officers of the department paid visits to estates and maintained close contact with members of the planting community. Agricultural problems were discussed on the spot and advice was given on cultural matters affecting any particular estate. Planters were also accorded interviews at headquarters and were given the opportunity of seeing the demonstration work of the department.

Estates in receipt of Government loans were inspected and reports submitted. The Agricultural Superintendent is a member of the Loans Investigation Committee which advises on matters of policy in connection with loans. Reports were also furnished to the Banana Association in respect of certain properties for which applications had been made for financial assistance.

The department continued to work in close collaboration with the Imperial College of Tropical Agriculture, Trinidad, and the Commissioner of Agriculture and members of his staff paid periodical visits to Dominica for the purpose of discussing and advising on local agricultural problems. The usual assistance in the determination of pests or diseases and advice in other matters was also given by officers of the College as occasion demanded.

The thanks of the department are due to Professor Hardy and the Chemical Department of the College for detailed analysis of soil profiles collected by officers of the department from representative sites at Copt Hall, Bath Estate and Picard Estate, comprising composite samples of soils where grapefruit, lime and cacao respectively are being grown.

Senior officers of the department accompanied Mr. Wimbush, the Chief Conservator of Forests, Madras, on a tour of inspection in connection with his study of the forest problems of Dominica. Mr. Wimbush was appointed by the Colonial Office to investigate and report on the steps to be taken to introduce a policy of forest conservation in relation to agriculture in the West Indies and that section of his report which deals specifically with Dominica is reprinted herein as an appendix.

The thanks of the department are extended to planters who generously afforded visiting officers their usual kind hospitality and in many instances supplemented existing facilities for travelling.

The Agricultural Advisory Committee appointed under Ordinance No. 6 of 1935 to advise the Government on matters of policy pertaining to agriculture met periodically during the year and meetings were well attended. The Agricultural Superintendent is *ex officio* a member of this body and the Assistant Agricultural Officer, headquarters, performs the secretarial duties.

The Fruit Trade Committee met as occasion demanded to consider and advise on matters affecting the fruit export trade. The Agricultural Superintendent is Deputy Chairman of the Committee and the Officer-in-Charge of the Government Marketing Depôt secretary.

6. CORRESPONDENCE.

Four hundred and eighty letters were despatched and two hundred and ninety-nine Minute Papers dealt with, in addition to many Confidential Minute Papers. Numerous agricultural and meteorological returns and departmental progress reports were prepared and submitted periodically. Various pamphlets and copies of reports on general agricultural matters were distributed locally to persons interested.

7. LABORATORY.

A small laboratory is maintained for the purpose of the simple examination and analysis of commercial products, and during the year the chief tests made were as follows :—

Raw Lime Juice	15
Concentrated Lime Juice	6
Bay Oil	206
Lime Oil	1
Milk	85

8. STAFF NOTES.

Mr. E. E. TAYLOR—It was with regret that for reasons of economy the department had to dispense on 27th April, 1936, with the services of this officer, who for a period of five years had efficiently carried out the duties of Officer-in-Charge, Government Marketing Depôt. Mr. W. E. BASSETT took over Mr. TAYLOR'S duties in addition to his own as Manager, Government Fruit Farm

Mr. G. J. STEDMAN, Foreman, Government Fruit Farm, was transferred on June 19th, 1936, for duty as Senior Banana Inspector and Agricultural Instructor, Northern District, and Mr. A. C. WINSTON, a senior pupil, was appointed to act in his stead.

Mr. G. A. WINSTON, Clerk, Government Marketing Depôt, was seconded for duty in the Public Works Department on the 27th October and Mr. J. B. BULLY of the Treasury Department acted during his absence.

Messrs. H. C. BURTON, R. P. LANDER, J. M. RENAULT, C. W. THOMAS, A. ISAAC and M. D. EDWARDS were temporarily appointed inspectors for banana disease control work. Mr. BURTON is senior inspector for the Southern and Eastern Districts.

All the members of the Junior Staff took local vacation leave during the year.

SECTION III.

FINANCIAL STATEMENT.

Expenditure and Revenue.—Statements of expenditure and revenue with regard to special services are given in the appropriate sections of the report. Expenditure, other than on special services, and the general revenue of the department were as follows:—

Expenditure.

	£	S.	D.
Personal Emoluments	1,228.	19.	2
Contingencies	12.	19.	9
Maintenance of Botanic Gardens	270.	0.	0
Cultivation of Demonstration Plots, &c.	235.	0.	0
Purchase of Special Manures	56.	7.	11
Experiment Station	314.	18.	2
Upkeep of Morne Bruce Lands & Military Cemetery	20.	0.	0
Chemicals & Apparatus	9.	3.	11
Upkeep of Horses & Mules	29.	19.	10
Tools and Equipment	70.	0.	0
Banana Disease Control	342.	2.	8
Agricultural Pupils	200.	9.	8
	£2,790.	1.	1

Receipts.

Limes	£346.	18.	7½
Cocoa	28.	15.	1
Fruit	35.	1.	10
Onion Seed	12.	15.	11
Laboratory Receipts	16.	13.	9
Miscellaneous	9.	11.	1
	£449.	16.	3½

SECTION IV.

SUMMARY OF LEGISLATION AFFECTING AGRICULTURE IN FORCE ON THE 31ST DECEMBER, 1936.

A. IMPORT RESTRICTIONS.

The Fumigation of Plants Ordinance, No. 9 of 1904, provides that all plants imported, together with the packages in which they are contained shall, subject to the discretion of the Agricultural Department, be fumigated.

Under the Plants Protection Ordinance, No. 2 of 1927, the following articles are prohibited or conditionally prohibited from importation:

IMPORT RESTRICTIONS.

a. ARTICLES ABSOLUTELY PROHIBITED.

Articles prohibited from importation.	*Countries from which importation prohibited.*	*Legislation.*
Fruit of the Banana	All countries, except Barbados and the Islands of the Leeward Islands Colony.	S.R. & O. No. 12 of 1932.
Fruit of the Lime	Bahamas, Bermuda, British Guiana, St. Lucia, Trinidad, and all other countries except the other islands of the British West Indies not in this paragraph mentioned.	ditto.
All other fruits except 1. Plantains 2. Nuts 3. dried, canned, candied or other processed fruits.	Bahamas, Bermuda, British Guiana, and all other countries except the British Isles, Canada, the British West Indies and the United States of America.	ditto.
All vegetables except 1. Onions 2. Irish Potatoes 3. Canned or processed vegetables.	ditto.	ditto.
Soil	All countries.	ditto.
Johnson Grass (*Holcus halepensis.*)	ditto.	ditto.
Plants and parts of plants (except commercial derivatives) of the genus Pimenta.	Jamaica.	S.R. & O. No. 13 of 1936.

b. ARTICLES CONDITIONALLY PROHIBITED FROM ALL COUNTRIES.

Articles prohibited from importation.	*Conditions of prohibition.*	*Legislation.*
Sugar cane, sugar cane seedlings and plants and all parts of the sugar cane.	Unless under licence granted by the Governor.	S.R. & O. No. 12 of 1932.
Banana plants and parts of banana plants.	ditto.	ditto.
Rooted plants and parts of the Citrus family.	Unless under licence granted by the Governor, and also unless accompanied by a certificate by a responsible inspecting officer stating that the district from which such plants originate has not been affected by, or has been free for the preceding two years of, Citrus Canker.	Ditto.
The fruit of the Lime.	Unless under licence granted by the Governor.	Ditto.
Cotton seed, cotton lint and seed cotton, and all packages, coverings, bags or other articles or things which have been used as packages or bags for cotton seed, cotton lint and seed cotton.	Ditto.	Ditto.
Sprouted coconuts, Coconuts in husk.	Ditto.	Ditto.
Cacao plants and parts of cacao plants.	Ditto.	S.R. & O. No. 3 of 1934.

Articles prohibited in the foregoing tables include all packages, coverings, wrappings and containers connected therewith.

B. EXPORT RESTRICTIONS.

The following table gives a summary of legislation affecting the export of agricultural produce :—

Products.	*Legislation.*	*Chief objects.*
Most Agricultural Exports.	Customs Import & Export Tariff Consolidation Ordinance, No. 11 of 1930	To determine the rates of export duty on certain agricultural products.
Limes, grapefruit, oranges, avocado pears, lemons, pineapples.	The Exportation of Fruit Ordinance, No. 4 of 1929. (Principal Ordinance) Amendment Ordinances, No. 13 of 1930 and No. 2 of 1933.	To provide for the exportation of the fruits specified to all countries except West Indian islands other than Bermuda, licensing of packing houses and appointment of fruit inspectors.
Cucumbers, ochroes, egg-plants, melons, sweet potatoes, string beans, sweet peppers, tomatoes, pumpkins, onions, and tangerines.	Statutory Rules & Orders, No. 17 of 1932.	To provide for the fruits and vegetables specified to come under the operation of Ordinance No. 4 of 1929.
	Statutory Rules & Orders, No. 9 of 1933.	To provide for standards of quality, grading, packing and marketing of fruits and vegetables, fees for inspection, and the appointment of a Fruit Trade Committee.
	Statutory Rules & Orders, No. 10 of 1933.	To authorise the Agricultural Superintendent to permit the exportation of unwrapped fruit to meet special demands.
Bananas.	The Exportation of Fruit Amendment Ordinance, No. 6 of 1933.	To authorise the inspection of bananas by fruit inspectors.
	The Banana Ordinance, No. 2 of 1934.	To create a body corporate to market bananas and to regulate and control the export thereof.
	Banana Rules, Statutory Rules & Orders No. 17 of 1935.	To regulate the operations of the Dominica Banana Association.
	Statutory Rules & Orders, No. 4 of 1934.	To authorise payment of overtime fees to fruit inspectors for the inspection of bananas.
Vanilla.	The Vanilla Ordinance, No. 23 of 1925.	To regulate the examination, curing and exportation of vanilla, and to prohibit certain dealings with the same.

MISCELLANEOUS LEGISLATION.

Products.	*Legislation.*	*Chief objects.*
Tobacco.	Statutory Rules & Orders, No. 4 of 1926.	Examination of and fees for.
	The Tobacco Ordinance, No. 2 of 1931.	To control the manufacture of tobacco and provide for the payment of excise duty.
	Statutory Rules & Orders, No. 16 of 1932.	

C. CONTROL OF DISEASES AND PESTS WITHIN DOMINICA.

Legislation.	*Chief objects.*
The Plants Protection Ordinance, No. 2 of 1927 (Principal Ordinance.)	For the prevention and eradication of diseases or pests affecting vegetation, and the appointment of inspectors.
The Plants Protection Ordinance, No. 5 of 1935.	To provide for the notification of such diseases or pests as may be declared notifiable.
Statutory Rules & Orders, No. 10 of 1935.	Declares Panama Disease (*Fusarium cubense*) to be a notifiable disease.

D. MISCELLANEOUS LEGISLATION.

Legislation.	*Chief objects.*
The Botanical Gardens Act, No. 1 of 1898. Statutory Rules & Orders, No. 19 of 1932. Statutory Rules & Orders, No. 10 of 1934.	For the protection, management and regulation of the Botanical Gardens.
The Agricultural Protection Ordinance, No. 8 of 1905. (Principal Ordinance) Amending Ordinances, No. 4 of 1912, No. 3 of 1917, No. 4 of 1922, No. 6 of 1925.	The provision of measures for the protection of crops against praedial larceny and the licensing of local purchasers.
The Milk Ordinance, No. 7 of 1922. Amendment Ordinance, No 4 of 1924.	Relating to the sale and adulteration of milk and providing for the appointment of an analyst.
The Agricultural Advisory Committee Ordinance, No 6 of 1935.	To provide for the establishment of an Agricultural Advisory Committee.

APPENDIX I.

Report of the Manager, Government Fruit Farm, Copt Hall.

The writer was Manager of the Government Fruit Farm, Copt Hall, throughout the year, and Mr. G. J. STEDMAN was Foreman from the 1st January to the 15th June. From the 16th June to the end of the year Mr. A. C. WINSTON, junior, who was designated Foreman's Deputy, carried out the principal duties of Foreman.

2. Development of the Farm in connection with a proposed land settlement scheme, and for purposes of agricultural demonstration and instruction, and as a trial ground for grapefruit and oranges, was continued and work done in 1936 followed more or less closely the lines described in previous reports.

3 The weather was not on the whole very favourable for the growth of young citrus trees. The year's rainfall at Copt Hall was 161.99 inches which is 27.67 inches above the average for the five years during which records have been kept. Except for about five months in the first half of the year flushes of new growth were weak, probably on account of lack of sunshine. The wind continued to retard development in many parts of the estate. Nevertheless, trees in all plots have increased considerably in size, both as regards height and spread of branches.

4. **Windbreaks.**—Much work was done on the provision of an adequate system of permanent windbreaks and a total length of 7,112 feet of new windbelts of *Inga laurina* was planted. These windbelts all consist of three rows of plants with a distance of a foot between the rows and whenever possible were placed along the ridges of hills or on similar high ground so as to be of maximum value in providing shelter. Older permanent windbelts were widened or lengthened and *Tephrosia candida*, *Cajanus Cajan* and *Gliricidia maculata* were extensively cultivated to give temporary protection.

5. **Planting.**—Approximately a thousand citrus trees were planted during the year as fillers between the older trees. The planting of fillers is now complete, excepting in one plot which until recently was used as a trial ground for lime hybrids.

6. **General Cultivation.**—A mixture of fish manure and sulphate of ammonia was again applied to all plots in two dressings, one being given in May and one in November. Windbelts and wide circles around all citrus trees were regularly weeded and the space between the trees was cutlassed sufficiently often to keep the growth of climbers and other rank weeds in check. Plantings of lemon grass were extended in order to provide additional material for mulching.

7. **Expenditure.**—Expenditure during the year was as follows :—

Personal Emoluments	£386.	2.	6
Annuity to previous owner	75.	0.	0
Tools	4.	19.	3
Nursery and Demonstration Plots ..	173.	17.	11
Estate Maintenance..	346.	10.	0
	£986.	9.	8

8. **Revenue.**—Revenue received from the sale of bananas was 8/6 and from the sale of Portugal and Satsuma oranges 18/4. Further small quantities of Portugal and Satsuma oranges were picked for shipment late in the season, for which returns had not been received by the close of the year.

W. E. BASSETT,
Assistant Agricultural Officer,
Manager, Government Fruit Farm.

APPENDIX II.

Report of the Officer-in-Charge, Government Fruit Packing and Marketing Depot.

Staff.—Mr. E. E. TAYLOR, who had been Officer-in-Charge since the 30th April, 1931, was in charge from the beginning of the year until the 7th March. He then left the island on leave prior to the termination of his appointment Mr. W. E. BASSETT carried out the duties of Officer-in-Charge from the 8th March to the end of the year.

Mr. G. A WINSTON, Clerk, Government Fruit Packing and Marketing Depot was temporarily transferred to the Public Works Department as Chief Clerk during the period 27th October, 1936 to the end of the year. During this time Mr. J. B. BULLY, Clerk, Treasury Department acted in his stead.

Work of the Government Marketing Depot. All fruit exported from Dominica, with the exception of that destined to neighbouring islands, limes shipped to the United States of America and bananas, is required by law to be packed at the Government Fruit Packing and Marketing Depot under the supervision of a Fruit Inspector. A cold storage plant, with chambers for pre-cooling fruit, is run in conjunction with the packing depot, and during the year 1936 was under the dual control of the Public Works and Agricultural Departments. The packing depot contains citrus packing house machinery, owned by a company engaged in citrus growing, and available for cleaning and sizing all oranges and grapefruit packed at the Depot.

The Depot undertakes the marketing of fruit for producers should they desire it and, as will be seen from Table I, considerable use is made of the Depot's marketing facilities.

Quantities and F.O.B. Values of Fruit Packed.—Table I shows the quantities and f.o.b. values of fruit packed and marketed, together with the quantities and values of all fruit packed, by the Depot. The estimates of the f.o.b. values are based on the actual returns for all fruit marketed by the Depot during the year. The number of crates packed shows an increase of 6,601 over the 13,919 crates packed in 1935, and the estimated f.o.b. value of all fruit packed shows an increase of £374. 6. 2 over the estimated f.o.b. value of all fruit packed in 1935. The increase in value appears disproportionately small when compared with the increase in quantity but this is probably due, not to lower prices, but to the fact that the values for 1936 have been based on returns for all shipments made and not on returns received to the end of the year only.

Average Returns and Packing House Costs.—Table II gives the weighted average returns and packing costs for the most important products marketed by the Depot. Here again the figures are based on all shipments made by the Depot during the year. The figures given as Packing House Costs include costs of labour and materials used in packing, pre-cooling, porterage, lighterage to steamer, Supervision Charges, Inspection Fees, Wharfage and Export Duty.

It is believed that the average net return to growers for each product as shown in Table II is more than sufficient to cover the costs of cultivation, picking and transport to the Packing Depot, with the possible exception of returns for grapefruit grown at considerable distances from motor roads, and involving very high transport costs. Prices for most fruits fluctuated considerably during their respective seasons and while returns were sometimes much in excess of the average, they were at other times insufficient to cover cultivation costs. The results of the year's working should therefore have proved satisfactory to most of those growers who were able to supply fruit regularly over fairly long periods. One or two small suppliers, however, who brought in fruit for only single shipments incurred losses.

With the exception of the returns on one experimental shipment made at a grower's request, the total amount involved in respect of debit notes to growers for fruit marketed by the Depot during the year was 2/4. Further details regarding net returns are included in the following paragraphs.

APPENDIX.

TABLE I.

Produce.	*Size of Crate in cub.ft.*	*Packed, but not marketed by the Depot.*		*Packed & marketed by the Depot.*		*Total packed by the Depot.*	
		Quantity.	*Estimated f.o.b. value.* £ s. d.	*Quantity.*	*F.O.B. Value.* £ s. d.	*Quantity.*	*Estimated f.o.b. value.* £ s. d.
Oranges ..	2	424	180. 4. 0	8,416	3,578. 15. 4	8,840	3,758. 19. 4
Grapefruit ..	2	207	71. 3. 1	2,536	873. 1. 5	2,743	944. 4. 6
Green Limes ..	¾	2,694	622. 4. 0	1,028	319. 8. 3	3,722	941. 12. 3
do. do.	2	616	384. 9. 9	3	10. 7	619	385. 0. 4
Lemons ..	2	17	9. 19. 9	166	97. 12. 10	183	107. 12. 7
Tangerines, etc.	¾	11	1. 6. 7	191	23. 2. 8	202	24. 9. 3
Avocado Pears.	¾	1,881	399. 14. 3	430	98. 8. 11	2,311	498. 3. 2
Grafted mangoes ..	¾	480	70. 0. 0	89	13. 0. 5	569	83. 0. 5
Ordinary mangoes ..	2	1,170	312. 0. 0	126	33. 19. 5	1,296	345. 19. 5
Pineapple ..	1¼	14	2. 11. 0	—	—	14	2. 11. 0
Pumpkins ..	brls.	—	—	21	9. 10. 11	21	9. 10. 11
Total ..		7,514	2,053. 12. 5	13,006	5,047. 10. 9	20,520	7,101 3. 2

TABLE II.

Produce.	*Size of crate in cubic ft.*	*Average f.o.b. returns.*	*Average Packing House costs.*	*Average net return to growers.*
Oranges	2	8/6	3/3½	5/2½
Grapefruit	2	6/10½	3/1½	3/9
Green Limes	¾	6/2½	1/9½	4/5
Lemons	2	11/9	3/7	8/2
Avocado Pears	¾	4/7	1/7	3/-
Grafted Mangoes.. ..	¾	2/11	1/6	1/5
Ordinary Mangoes ..	2	5/4	2/11	2/5

Oranges.—Oranges exported early in the year were mainly "Valencias" and represented the end of the 1935-36 main crop. Those shipped to Bermuda produced for growers net returns of 6/1 per crate and those shipped to Canada net returns varying from 2/3 to 3/3 per crate.

The summer crop of "Washington Navel" oranges picked between the middle of July and early September, and shipped to Bermuda and Canada, produced net returns ranging from 8/1 to 11/2 per crate.

The harvesting of the 1936-1937 main crop of the variety "Washington Navel" began in October and continued till the end of the year. Returns to the grower for fruit of this variety shipped to Bermuda remained very steady at about 7/6 per crate throughout the season.

Returns per crate for oranges of the same variety shipped to the Canadian ports, St. John, Halifax and Montreal in October and early November were very satisfactory, but fell rapidly as the season advanced, mainly on account of the heavy stocking of the markets with fruit from Jamaica and California. Net returns to the grower ranged from 9/- to 2/1 per crate.

A few hundred crates of oranges from seedling trees were shipped to St. John and produced returns to growers about 2/- per crate less than the returns for "Washington Navels."

Oranges of the variety "Valencia" ripened late in the season when prices obtainable in Canada were low. Net returns to growers for fruit of this variety shipped to Canada ranged from 3/9 to 1/1 per crate. A shipment of "Valencia" oranges to Bermuda produced a return to the growers of 7/6 per crate.

Grapefruit.—Practically all the grapefruit marketed by the Depot went to St John and Halifax. Prices received early in the season were very remunerative, one shipment of "Triumph" Grapefruit made at the end of August producing a net return of 10/3 per crate.

From the beginning of October to the end of the year prices were low and, although it was possible to sell fruit of the varieties "Marsh" and the pink-fleshed "Foster" throughout the season, the demand for ordinary seeded varieties was so poor that the export of "Triumph" and "Duncan" was discontinued in November.

Approximate average net returns to growers for grapefruit shipped after September were 3/6 for "Marsh" and "Foster" and 2/6 for "Triumph" and "Duncan."

Green Limes.—Green limes packed at the Depot during 1936 in tomato lugs equalled approximately 508 barrels, and those packed in citrus crates equalled approximately 309 barrels, making a total of 817 barrels, or 23% of the island's green lime exports for the year. Of the green limes packed at the Depot 19% were marketed by the Depot's agent in Montreal, the remainder being marketed by private shippers. During May quantities ordered by the Depot's agent in Montreal were greater than could be supplied. The first shipment to him was made at the beginning of May, and consisted of 100 tomato lugs shipped on consignment. In respect of this shipment the Depot paid to its suppliers 6/6 per lug, a figure equivalent to 43/4 per barrel. Later in the month two shipments were sold outright, again producing prices which compared very favourably with prices received from the United States of America for limes exported in barrels at that time. From June onwards the Depot made no further shipments, as its agent in Montreal was unable to make further outright purchases and the Depot's suppliers were unwilling to have their limes shipped to him on consignment.

Lemons.—Sixty-five crates of lemons were shipped to Bermuda producing an average net return to the grower of 9/- per crate, and 101 crates were shipped to St John giving an average net return of 7/7 per crate. These returns should be considered satisfactory, although the net price to the grower for lemons shipped to St. John in December dropped to 1/2 per crate.

Tangerines and Other Small Citrus Fruits.—Small shipments of tangerines, mandarin oranges, Satsuma oranges and Portugal oranges packed in tomato lugs were made to St. John, but the demand for this type of fruit was very limited and net returns to growers ranged from 2d. to 1/3 per lug.

Sixty-four tomato lugs of tangerines shipped to Bermuda brought for growers an average net return of 1/5 per lug.

Avocado Pears.—Although the quantity of Avocado pears marketed by the Depot in 1936 was slightly less than in the previous year the total packed was larger due to the marked increase in the quantity prepared for shipment by the Depot on behalf of private shippers. Practically all the Avocado pears packed at the Depot were sent to Bermuda. Some difficulty was again experienced in placing them on the market in saleable condition owing, apparently, to the breakdown of pears of some varieties either in transport or within a very short time after removal from cold storage This accounted for the very considerable fluctuations in price, net returns to growers for fruit marketed by the Depot varying from 1/3 to 5/4 per tomato lug containing about 25 fruits.

Grafted Mangoes.—The total quantity of grafted mangoes packed in 1936 showed a considerable increase over that of any one of the last five years, the increase being entirely due to the larger quantities packed for private shippers for export to Bermuda. The grafted mangoes packed were almost all of the variety "Julie". The small quantity marketed by the Depot's agent in Bermuda produced for growers an average net return for the

season of 1/5 per tomato lug containing about 33 fruits. The season lasted from late May to late August.

Ordinary Mangoes.—The season for ordinary mangoes lasted a little longer than that for grafted varieties. The bulk of the ordinary mangoes packed in 1936 were for private shipment to Bermuda. Depot shipments produced an average net return, for the season, of 2/5 per citrus crate containing about 180 fruits.

Finance.—The payment in advance for local expenses on fruit marketed by the Depot and the purchase of packing materials are financed by an Advance Account.

The General Expenditure and Revenue of the Government Fruit Packing and Marketing Depot and Cold Storage for the year is set out in a statement following this report, and shows that revenue was £213. 19. 9½ in excess of expenditure. This statement does not include the cost of electric current supplied to the Depot for lighting and power and for which no charge is made, or the salary of the Officer-in-Charge since the 28th April, 1936, which was wholly paid from Head of Estimates VII (2) Government Fruit Farm (Copt Hall), or depreciation on buildings and plant.

General.—All green limes for shipment to the United States of America, packed at 5 licensed packing houses, were inspected by the Officer-in-Charge or the Foreman.

The Foreman was the officer appointed to witness sales of vanilla in Roseau and recorded 1,167 sales during the season. The Officer-in-Charge was Vanilla Examiner and inspected all vanilla exported.

The Officer-in-Charge was secretary of the Fruit Trade Committee and the Statutory Committee of Export Values.

During the year 326 letters and 85 cablegrams were dispatched. Three hundred and forty-eight account sales were sent to growers in respect of produce shipped by the Depot on their behalf. Account sales were usually submitted to growers and returns paid within a week of the receipt of account sales from the Depot's overseas agents. Weekly reports of values of produce computed by the Statutory Committee of Export Values, together with local values of other produce, were compiled and sent to the Customs Department and the local press.

Acknowledgments.—The writer gratefully acknowledges the ready assistance and co-operation given him by the staff and other workers during his first year in charge of the Depot.

W. E. BASSETT,
Assistant Agricultural Officer.
Officer-in-Charge,
Government Marketing Depot.

GOVERNMENT FRUIT PACKING AND MARKETING DEPOT AND COLD STORAGE.
STATEMENT OF GENERAL EXPENDITURE AND REVENUE
FOR THE YEAR ENDED 31ST DECEMBER, 1936.

EXPENDITURE.	£	S.	D.	REVENUE.	£	S.	D.
Personal Emoluments	481.	4.	7	Sale of Ice	239.	8.	3
Running and Maintenance ..	108.	19.	4	Cold Storage Rents.. ..	111.	1.	9
Wages of Staff	97.	0.	6	Profits on materials, and Marketing Commission ..	280.	11.	11½
Contingencies	14.	5.	6	Inspection, Packing House and Overtime Fees ..	296.	17.	7
Printing and Stationery ..	14.	12.	3	Miscellaneous receipts ..	2.	2.	5
	716.	2.	2				
Excess of Revenue over Expenditure	213.	19.	9½				
	£930.	1.	11½		£930.	1.	11½

G. A. WINSTON,
Clerk,
Government Marketing Depot.

W. E. BASSETT,
Officer-in-Charge,
Government Marketing Depot.

METEOROLOGICAL SUMMARY, BOTANIC GARDENS, DOMINICA, 1936.

Year. 1936.	PRESSURE. *Corrected & reduced to 32° F., M S.L.*				TEMPERATURE.								RELATIVE HUMIDITY.		RAIN-FALL.
	Highest.	Lowest.	Means.		Absolute.		Mean Values.						Means.		Amount.
					Max.	Min.	Max.	Min.	Dry Bulb.		Wet Bulb.				
	—	—	9 a.m.	3 p.m.	—	—	—	—	9 a.m.	3 p.m.	9 a.m	3 p.m.	9 a.m.	3 p.m.	-
	IN.	IN.	IN.	IN.	°F	°F	°F	°F	°F	°F	°F	°F	%	%	IN
January ...	30.11	29.85	30.03	29.92	85	60	83	63	77	81	71	73	74	64	3.46
February ...	30.10	29.81	30.06	29.93	86	61	84	63	76	81	71	72	69	61	2.50
March ...	30.06	29.84	29.99	29.91	88	61	86	64	79	84	73	76	73	66	.82
April ...	30.12	29.87	30.01	29.98	89	63	86	66	80	84	73	75	69	63	3.04
May ...	29.99	29.81	29.91	29.86	92	65	89	69	83	86	77	79	71	69	2.34
June ...	30.06	29.86	29.97	29.92	92	69	89	70	83	87	77	78	73	64	6.47
July ...	30.05	29.91	29.98	29.95	90	68	87	70	81	85	76	78	76	67	18.48
August ...	30.01	29.81	29.94	29.89	90	67	87	70	82	85	76	79	75	73	10.38
September ...	30.00	29.83	29.93	29.87	91	65	88	69	83	86	78	78	75	68	11.14
October ...	30.01	29.80	29.92	29.85	90	68	87	69	82	85	77	78	79	69	7.65
November ...	30.01	29.75	29.93	29.85	89	67	87	68	80	85	76	77	80	67	12.14
December ...	30.02	29.75	29.94	29.86	87	63	85	65	78	83	73	75	78	62	10.84
Year ...	30.04	29 82	29.97	29.90	89	65	86	67	80	84	75	76	74	66	89.26

Highest Barometer Reading (corrected):	30.12 in. on 14th April.
Lowest ,, ,, ,,	29.75 ,, ,, 2nd November and 10th December.
Highest maximum temperature:	92°F ,, 28th May and 5th June.
Lowest minimum ,,	60°F ,, 3rd January.
Greatest rainfall in 24 hours:	5.27 in. ,, 30th December.

RAINFALL AT THE BOTANIC GARDENS, DOMINICA, 1917–1936.

	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Monthly Mean Rainfall.
January ...	5·00	6·02	2·42	7·54	6·82	6·50	3·82	6·25	7·88	3·68	5·50	6·60	5·18	10·65	1·47	5·47	7·30	4·81	2·37	3·46	5·43
February ..	4·10	8·73	1·52	4·76	1 02	4·30	2·30	1·90	1·95	2·46	4·50	4·25	3·13	2·07	1 05	1·57	2·13	1·70	1·59	2·50	2·87
March ...	6·74	3·32	·69	3·80	4·46	2·80	3·46	·66	3·50	·96	5·37	6·30	7·36	3·89	·59	1·56	2·37	3·36	6·90	.82	3·44
April ...	·47	1·86	2·36	·22	3·06	2·26	3·77	1·46	·40	2·77	4·67	4·16	1·27	5·01	·51	2·33	2·03	2·91	1·45	3.04	2·30
May ...	2·94	5·90	4·60	2·38	1·54	2·64	·13	3·18	2·76	2·44	6·69	2·25	2·80	2·21	1·70	5·07	2·26	3·82	4·27	2·34	3·09
June ...	15·34	6·04	3·88	3·48	1·96	7·14	4·18	4·42	5·80	5·76	15·03	6·68	10·87	7·32	9·98	10·72	7·05	2·59	5·04	6·47	6·98
July ...	13·70	11·28	12·64	12·08	11·18	6·08	8·20	13·64	6·23	10·14	9·61	6·58	13·13	7·90	18·45	8·05	12·30	9·54	13·47	18·48	11·13
August ...	8·53	8·46	9·64	8·73	9·30	9·26	11·44	11·28	13·88	10·10	4·65	12·80	12·55	6·76	17·44	7·23	7·94	7 61	8·87	10·38	9·84
September.	15·02	4·14	7·06	8·60	6·28	10·68	4·28	4·88	9·12	4·12	6·20	8·10	5·63	14·66	13·51	6·13	11.51	4·08	12·93	11·14	8·40
October ...	2·46	6·67	7·50	12·60	9·41	2·68	9·84	10·98	12·55	5·86	8·84	4·35	12·19	3·15	9·71	6·72	9·26	3·89	5·43	7·65	7·58
November.	1·92	3·36	9·02	4·62	2·44	3·00	1·06	6·86	9·60	7·54	8·70	7·93	14·39	5·51	11·90	13·83	11.04	5·58	3·39	12·14	7·19
December .	4·58	5·86	6·70	5·62	4·22	6·90	1·92	13·65	2·02	3·75	1·37	5·38	8·48	3·66	7·56	5·21	7·03	9·46	6·24	10·84	6·02
Total ...	80·80	71·46	68·03	74·46	61·72	64·24	54·40	79·16	75·69	59·58	81·13	75·38	96·98	72·79	93·87	73·89	82·22	59·35	71·95	89·26	– –

Average year = 74·31 inches.

RAINFALL RETURNS, DOMINICA, 1936.

Stations.		Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.	Totals.
1. Batalie	L ...	1.12	1.15	.00	1.13	3.21	1.03	16.28	9.72	6.42	7.51	9.49	3.96	61.02
2. Botanic Gardens	L ...	3.46	2.50	.82	3.04	2.34	6.47	18.48	10.38	11.14	7.65	12.14	10.84	89.26
3. Bath	L ...	3.78	2.56	.53	2.81	2.71	6.13	18.72	11.37	7.33	11.22	8.87	9.64	85.67
4. Blenheim	LAS.	4.94	2.25	.66	4.82	15.91	8.06	20.57	15.84	7.34	15.80	17.70	12.40	126.29
5. Canefield	L ...	3.15	1.80	.30	3.05	3.14	5.78	17.09	12.63	8.28	6 86	12.97	10.77	85.82
6. Clark Hall	L ...	4.29	2.00	.24	6.14	4.84	9.93	20.15	11.56	11.21	13.83	14.61	8.79	107.59
7. Copt Hall	L ...	7.19	4.67	1.31	9.43	7.39	11.32	23.86	16.69	17.49	18.32	25.83	18.49	161.99
8. Fond Hunt	I ...	14.84	10.71	4.02	11.75	7.92	13.42	21.49	19.87	25.13	13.78	18.59	13.12	174.64
9. Governor	W ...	6.33	4.85	2.20	7.27	23.92	12.53	33 67	17.35	17.03	26.35	23.77	18.09	193.36
10. Hampstead	LAS.	3.03	2.20	.95	4.02	12.21	6.95	15.12	12.74	12.64	17.35	15.65	9.10	111.96
11. Morne Bruce	L ...	3.96	3.00	.90	3.56	2.61	6.84	19 47	10.75	11.43	9.09	14.41	11.88	97.90
12. Moore Park	I. ...	4.30	1.99	1.40	3.82	15.29	9.64	20.22	18.21	10.82	17.16	20.92	20.21	143.98
13. Picard	L ...	5.02	2.76	1.15	3.46	9.05	4.53	18.71	11.95	8.19	13.48	9.47	6.13	93.90
14. Pte. Mulâtre	W ...	5.11	5.44	4.01	3.61	11.30	11.02	13.83	16.35	14.97	16.10	15.80	11.67	129.21
15. Rosalie	W ...	5.27	5.47	5.10	5.38	24.55	9.83	15.64	19.79	14.59	25.80	31.30	17.05	179.77
16. Ridgefield	L ...	6.90	5.15	2.10	6.46	7.08	14.58	22.72	16.06	16.94	14.02	19.87	15 34	147.22
17. Shawford	I ...	20.78	12.30	3.60	12.92	16.36	20.51	43.54	34.21	24.69	40.13	36.79	27.13	292.96
18. Sherwood	I ...	11.40	6.55	1.95	9.80	14.30	15.44	31.10	21.35	13.00	26.40	33.65	22.25	207.19
19. Stowe	W ...	5.56	6.35	2.63	3.67	8.23	8.28	13.56	14.67	10.66	11.78	18.74	9.34	113.47

Mean Rainfall 19 Stations ... ... 137.01 inches.
, ,, 9 Leeward Stations... ... 103.37 ,,
,, ,, 4 Windward ,, ... 153.95 ,,
,, ,, 4 Inland ,, ... 204.69 ,,
,, ,, 2 Lasoye ,, ... 119.12 ,,

APPENDIX IV.

REPORT BY THE IMPERIAL INSTITUTE ON VETIVER ROOTS FROM DOMINICA.

IMPERIAL INSTITUTE,
LONDON, S. W. 7.

THE sample of vetiver roots which is the subject of this report was forwarded to the Imperial Institute by the Agricultural Superintendent and is referred to in his letter No. 71/36 of the 6th March, 1936.

RESULTS OF EXAMINATION.

The sample, which weighed 28 lbs., consisted of pale yellowish-brown vetiver roots, free from rhizomes and in good clean condition. The material possessed the characteristic odour of vetiver roots. On distillation in steam the ground roots yielded 3·7 per cent of a dark reddish-brown, very viscous oil of good aroma, having the following constants, which are shown in comparison with those recorded for vetiver oil distilled in Europe from imported roots and for oil distilled commercially in Réunion :—

	Present Sample.	*Commercial vetiver oil*	
		European-distilled oil.	*Réunion-distilled oil.*
Specific Gravity at 15·5/15·5°C	1·0325	1·013 to 1·040	0·990 to 1·020
Optical Rotation aD	(Oil too dark to obtain reading)	+25° to +41°	+14° to +37°
Refractive Index nD20°C	1·5265	1.522 to 1.528	1.515 to 1·529
Acid Value	47·8	27 to 75	4·5 to 17
Ester Value	21·2	8·4 to 23	5 to 20
Ester value after acetylation	130·0	120 to 173	119 to 145
Solubility in 80 per cent alcohol at 15·5°C	Soluble in 1 vol., becoming turbid with 5 vols. or more.	Soluble in 1 to 2 vols. With more vols., sometimes opalescent to turbid.	

These results show that the Dominica roots furnished an excellent yield of oil of good aroma, the constants of which correspond with those of oil distilled in Europe from imported vetiver roots. Samples of vetiver roots previously received at the Imperial Institute from different countries have yielded on distillation under similar conditions from 1 to 3·3 per cent of oil, and the present yield (3·7 per cent) is therefore very good. Recorded figures show that Indian roots yield only up to about 1 per cent of oil.

The present distillation, as in the case of previous distillation of vetiver roots at the Imperial Institute, was continued until the roots were practically exhausted of the oil. In Réunion and Java, however, where the roots are commercially distilled, it is found uneconomical to carry the distillation to finality, as a point is reached beyond which any additional oil obtained no longer pays for the cost of the further distillation. In Java the economic yield is said to be from 2 to 3 per cent, whereas if the distillation were prolonged a total yield of 4 per cent is stated to be obtainable.

COMMERCIAL VALUE.

The oil distilled from the roots at the Imperial Institute was submitted to three firms of essential oil distillers in London who were asked for observations to its quality and value and the market possibilities in the United Kingdom of the roots yielding it. Their replies are as follows :—

(1) "We are interested in the roots, as we have considerable difficulty in getting a reliable supply of roots. We should like to be put in touch with the supplier, if he is open to quote us for a supply."

(2) "The odour of the oil under examination is very good indeed, somewhat like Bourbon oil, but more violet-like. This is an oil for which we might find an outlet, and

we would like to make the suggestion that if the root is available in reasonable quantities we might undertake the distillation here. We think the oil being a valuable one should be distilled under chemical control."

(3) "In our opinion this oil possesses an excellent odour, and is much superior to the ordinary Bourbon and Java vetiver oils of commerce. This may be due to the roots having been well dried during transport before distillation, and this fact also accounts for the high yield of oil, which is stated to be only from 0.5 to 0.9 per cent from the fresh roots. We consider the oil would be very valuable for perfumery work. The market for high-grade vetiver oil is to-day about 35*s.* to 36*s.* per lb. The suggestion is made that the English distiller could pay say 80*s.* to 100*s.* per cwt. for the dried root, and that English distilled oil could be offered to English perfumers."

REMARKS.

From the results of examination and the opinions of the essential oil distillers quoted above it will be seen that, although the market for vetiver roots in the United Kingdom is limited, there should be an outlet for supplies of the quality of the present sample, and that the product would be saleable at a good price, comparable with that ruling for the vetiver roots imported from Java, which were recently selling in London at 90*s.* 6*d.* per cwt. It is therefore suggested that a trial shipment should be prepared and forwarded to test the market.

30th June, 1936.

APPENDIX V.

REPORT ON A VISIT TO THE BANANA PRODUCING AREAS OF DOMINICA.

By C. W. WARDLAW.

1. In company with Mr. F. G. HARCOURT, Agricultural Superintendent, visits were made to banana-producing areas in proximity to Roseau, and to some of those in the Fond Hunt, Hatton Garden, Concord, Londonderry and Blenheim districts, these collectively being representative of Island conditions.

2. From this inspection and from the production data available it would appear that in Dominica there is the possibility of developing and maintaining for some years a modest banana industry, *provided certain precautions are taken now.* In so far as it is safe to forecast banana production, an export of 150,000 bunches (valued at £15,000 approximately) may be anticipated for 1937. Allowing for the continuation of planting activities during the next three years, and assuming that the new areas selected can be kept in production for four years, the export figure cited above may be maintained for a period of 6–7 years. No doubt this will be regarded by some members of the planting community as a very conservative estimate. It is submitted here, not as an attempt at a final assessment of the banana possibilities of Dominica, but simply to afford some indication of the value of the industry to the Island over a period of years, provided a minimum steady production can be maintained.

3. The factors controlling banana production in Dominica are the incidence and rate of spread of Panama Disease, duration of active production on new areas and transport.

4. Recent departmental records, based on inspections of estates, tenants' holdings and peasants' properties, show that in the majority of properties Panama Disease has not yet been observed. In the remainder, disease incidence has been described as *light* (3-4-5 plants per acre) and *heavy* (exact data not usually available). For the purpose on hand these observations might be restated and extended by saying that heavy infections are characteristic of the older properties where the Gros Michel has been cultivated for many years, and that a general light infection is present or may be expected on recently opened areas, the disease having been taken there through the use of infected planting material. The evidence for the latter aspect of Panama Disease distribution is beyond dispute.

5. In the writer's opinion, a survey of the heavily-infected areas should be undertaken at once, and quarantine measures put into operation where necessary, so that no planting material of any kind can be removed. Appropriate legislation is already in existence. With such bad areas defined and eliminated once and for all, the task confronting the De-

partment will be to control the relatively light infections present on the new and productive areas.

6. In the newly-opened banana lands, where only a few cases of disease have been observed, it cannot be too strongly emphasized that the use of infected planting material—suckers or bits—has been responsible for the initial outbreaks. If the situation is not taken in hand at the earliest opportunity, it is evident that Panama Disease will be spread wherever banana cultivation is attempted. It is here that an adequate service of agricultural inspector-instructors can do much to safe-guard the industry.

7. The duties of the inspector-instructors as conceived by Mr. HARCOURT and the writer should include :—

(*a*) routine inspection of properties for Panama Disease and Bacterial Wilt Disease (see paragraph 10) and treatment of all diseased stools.

(*b*) instruction regarding the improvement of cultivation.

8. It may be anticipated that the less informed members of the peasant class will tend to avoid the use of killer gas oil (used in the destruction of infected plants) on grounds of cost. During the initial campaign, therefore, it is suggested that the inspector be made responsible for the actual application of gas oil. Having marked the diseased plants, the inspector would demonstrate to the peasant proprietor the method of preparing a stool for treatment. The peasant would then carry out the necessary operations, the inspector making the required application of killer-oil. This procedure will not only make for a useful co-operation between the inspector and the peasant but it will also ensure that diseased plants are adequately treated at the earliest opportunity. Records of disease distribution submitted by the inspectors will also tend to have greater value.

Estate owners, in their own interests, may be expected to undertake the work of eradicating diseased plants from their plantations and from those of their tenants. The securing of co-operation in this matter may be safely left in Mr. HARCOURT'S hands.

Areas in which more than 5 per cent of the stool have succumbed to Panama Disease should not be used as a source of planting materials.

9. The controlling of Panama Disease, in the writer's opinion, is only one aspect of conserving the banana industry in Dominica. On properties of all kinds (estates, tenants' and peasants') there is room for considerable improvement in those agricultural operations on which increased out-put and prolongation of productiveness depend. Because of transport difficulties, this aspect is of fundamental importance to the future welfare of the industry ; under present conditions the more accessible and better lands tend to be exploited first, to be followed by a retreat to less accessible and less fertile regions. Fortunately the agricultural operations required are of the simplest and for success require only a little knowledge and sympathetic guidance. They include :—

(i) the use of good planting material ;

(ii) pruning or desuckering of plants according to the fertility of the soil ;

(iii) a minimum of cultivation including the elimination of grass, the proper use of mulch, and some forking or stirring of the soil round the stools ;

(iv) removal of vines and avoidance of excessive shade.

It is here that intelligent inspector instructors, having established friendly co-operation with the peasantry during the treatment of diseased plants, can be of invaluable assistance. Properties which would normally be abandoned after 2–3 years could easily be maintained in production for 4–5 or more years. It need hardly be said that it is in the interest of estate owners not to allow their better areas to go out of cultivation after a minimum period of cultivation.

10. During the writer's visit, Bacterial Wilt Disease affecting the Gros Michel variety was diagnosed on several properties. The evidence indicates that this wilt disease is less virulent than Panama Disease but may have a fairly wide distribution. The same treatment is applicable to both diseases.

11. To carry out disease control and instruction of peasants as outlined above, an adequate service of inspector-instructors should be instituted. The number required is chiefly determined by difficulties of transport and the inaccessible nature of the country. During the initial stages, it would appear that at least seven inspectors will be required, four for the northern section and three for the southern section of the Island, thus :

Northern Section.	
1 Senior Inspector (who will also be a well-trained agricultural instructor) ..	£150
3 Inspectors at £50 each	£150
Southern Section.	
1 Senior Inspector	£100
2 Inspectors at £50 each	£100
Gas oil, etc.	£100
	£600

It is suggested that funds should be allowed for a period of two years, at the end of which time the success or otherwise of the organization should be reviewed. It may be mentioned that this sum is only slightly greater than that now being expended for the same purpose in St. Lucia where, it would appear, a very adequate control of disease is being obtained. Transport facilities in the two Islands, however, are not comparable.

In considering the advisability of undertaking this expense, the sum of £600 for two years should be viewed, not only in relation to the anticipated income of £15,000 per annum, but also in relation to the sum of £100,000 accruing to the Island (as a conservative estimate) during the next seven years, the maintenance of production during that period depending on the action which is taken now.

12. A question which may be put is this: What would be the result if the industry were allowed to proceed without the supervision suggested above? The answer is that both the amount and duration of production will inevitably be reduced. It is to offset this eventuality that action should be taken at the earliest opportunity.

These several aspects of the banana industry in Dominica have been fully discussed with Mr. F. G. HARCOURT the Agricultural Superintendent, to whom the writer is deeply indebted for his collaboration and in whose hands details of organization, in the light of local knowledge, may safely be left. The writer would also express his thanks to Mr. G. A. JONES, Commissioner of Agriculture, for placing all relevant information at his disposal and to members of the planting community for their courteous assistance and hospitality.

APPENDIX VI.

EXTRACT FROM A REPORT ON THE FORESTRY PROBLEMS OF THE WINDWARD AND LEEWARD ISLANDS.

By A. WIMBUSH.

DOMINICA.

87. I spent a fortnight in Dominica and devoted part of the time to making excursions from Roseau and part of the time to visiting the important forest areas in the north of the island, spending nights at Du Blanc, Picard and Hatton Garden.

88. The Crown Lands in Dominica are in charge of the Surveyor-General who is also the Colonial Engineer. As head of the Public Works Department this officer is fully employed in his engineering capacity and has no time to devote to the Crown Lands. He has no staff whatever employed in connection with the Crown Lands which are estimated very roughly to cover about 150 square miles, or half of the island.

89. From the approximate area given above it will be realized that there is about three times as much Crown Land in Dominica as in all the rest of the Leeward and Windward islands put together. No Government officials know exactly where the boundaries of the Crown Lands are and, there being no subordinate staff to look after the area, no attempt is made to protect it, with the result that squatters clear and burn areas of forest for temporary provision gardens and exploiters of timber fell trees and extract boards and shingles wherever they like without let or hindrance and without Government getting any direct revenue from the forest.

90. The forest on private estates, which latter usually are nearer to the sea than are the Crown Lands, suffers as much as or more than the Government forest from the depredations of timber fellers and squatters. It is stated by a private owner of property who is building himself a house that it is becoming increasingly difficult to obtain the best sorts of building timber owing to the illicit felling which is constantly going on.

91. The area of Dominica is about 300 square miles and from the forestry point of view it is one of the easiest of the islands to describe. Practically all round the sea board is a belt, up to about a mile wide, of privately owned land. From Roseau, the capital, which is towards the southern end of the west or leeward coast, three motor roads radiate. One goes in a south-easterly direction to the south coast at Grand Bay; another goes about half way up the west coast to a point just north of the Layou River; the third is the Imperial Road which goes from Roseau in a north-easterly direction more or less up the centre of the island to Riversdale Estate which is shown on the map as being practically in the middle of the island.

92. The second town of importance in Dominica is Portsmouth which is approximately the same distance from the north end of the west coast as Roseau is from the south end. From here a motor road crosses the northern end of the island in an easterly direction to Marigot and Hatton Garden Estate.

93. The normal means of communication between Roseau and Portsmouth is by motor launch and the only means of getting along the east or windward coast between Grand Bay in the south and Hatton Garden Estate in the north-east is by a rough bridle path.

94. Dominica is extremely mountainous and is probably the wettest of all the islands. The rainfall on Mt. Diablotin and the other mountains towards the north is round about 300 inches a year and yet the greater part of the western seaboard has the appearance of being a comparatively dry area, characterized by low, scrubby growth which is constantly burnt in the dry weather.

95. Very roughly speaking, the whole of the interior core of the island is Crown land, except for a strip along the Imperial Road in which there are a few estates, most of which were abandoned when "wither-tip" attacked the lime trees and made the cultivation of limes in the wetter districts no longer profitable.

96. There is no land tax in Dominica and so abandoned estates do not revert to the Crown owing to failure to pay taxes, as would be the case in certain other islands.

97. There is great variation in the forest growth in Dominica. Some of the areas visited in the neighbourhood of Fond Hunt, on the north-western slopes below Mt. Diablotin, contain as fine a growth of Tropical Rain Forest as I have seen. The outstanding species, both as regards large size and symmetry of bole is the Gommier (*Dacryodes hexandra*). A long list of Dominica trees is given in "Notes on Dominica and Hints to intending Settlers —1919" of which the commonest ones, brought prominently to my notice during inspections, appear to be Bois Riviere (*Chimarrhis cymosa*) Caconier (*Ormosia dasycarpa*), Balata (*Bumelia retusa*), Carapite (*Amanoa caribœa*), Chataignier (*Sloanea massoni*), Courbaril (*Hymenea courbaril*) Mahot cochon (*Sterculia caribaea*), Mangue blanc (*Moronobea coccinea*), Mangue rouge (*Tovomita plumieri*) and Bois blanc (*Simaruba amara*). The above list is far from being complete and every tree in it was unknown to me on coming to the West Indies.

98. The best forests actually seen by me were on private land but I also saw excellent forest on Crown Lands in the neighbourhood of Morne Concorde above Hatton Garden Estate.

99. As regards the possibility of exploiting the timber forests of Dominica profitably several essential facts have to be taken into consideration. Some 30 years ago a company was formed for working the forests. It is said that £80,000 were sunk in the venture and a large saw mill was erected near Portsmouth. A forest tramway was laid down and every preparation for work on a large scale was made. After a short time the venture failed and to-day the derelict saw mill serves as a warning for the future.

100. There is no need to go into details regarding the various reasons for failure; it will suffice to say that Dominica is by no means the only country in which similar attempts to introduce large scale logging operations in tropical forests, in which only a limited number of species are saleable, have failed and that any attempt to repeat the experiment in Dominica would be foredoomed to failure.

101. There remains the question as to whether a modest scheme of exploitation by means of hand-sawing in the forest could be developed profitably in Dominica where no means exist of extracting the very large timber to the coast in the form of logs.

The first point to consider is whether the produce could be sold at a profit if it were extracted. Enquiries made by me comparatively recently when faced with a somewhat similar problem in India lead to the conclusion that there is no profitable demand for Dominican hand-sawn timber in England and it may be assumed that there is none in Canada or America.

102. The local demand is very strictly limited. Such as it is, it is already being met and even if Government and the estate owners take steps to see that it is obtained legitimately instead of by theft, this will not increase the demand as such.

103. A possible source of future demand is for sleepers for the Jamaica Government Railway. If the proposals which I have made for restricting the felling in Jamaica are given effect to it is highly probable that the Railway will have to import some sleepers annually and it might be possible to make a supply from Dominica. This would appear to be a matter for private enterprise and it is understood that enquires will be made by a private estate owner in Dominica who owns forests containing species which might prove suitable for railway sleepers

104. From the point of view of general forest conservation and protection of the water sources of Dominica there is a strong case for Government action. It is highly unsatisfactory to find that there is no Forest Ordinance and no protective staff and that the Crown Lands of Dominica are at the mercy of practisers of shifting cultivation and exploiters of timber.

105. It is true that destruction of the forests has not yet reached such a serious stage in Dominica as in some other islands but it is highly important to look to the future. The Crown Lands in the southern half of the island have been seriously mishandled. To the layman it may appear that there is a wealth of vegetation on the ground but to the Agriculturist and Forest Officer the large areas covered with tree ferns and miserable secondary growth of trees which result from an impoverished and degenerated soil are a source of anxiety for the future.

106. In the month of March smoke from numerous areas which have been cleared illicitly for shifting cultivation can be seen on the hills. Such areas are no further use for agriculture after a year or two and it must be obvious that the process of destroying the fertility of the best land in small patches year after year cannot go on indefinitely without dire results ensuing.

107. Years and years ago Government ought to have carried out a Revenue Settlement and Forest Settlement combined with a survey of the island. In Dominica, where about half of the island consists of Crown Land, it is by no means too late to do this now and that is what ought to be done if funds and staff can be provided.

108. If it is found impossible to provide funds and staff for a Revenue and Forest Settlement and a survey, the following suggestions are offered as being likely to lead to some improvement upon the present nebulous state of affairs.

(I) A Forest Ordinance, based upon the Madras Forest Act, should be drawn up and passed.

(II) A young and very active officer should be placed on special duty for selecting and demarcating areas of Crown Land which it is desirable to form into Reserved Forest. In making the selection it is suggested that due regard should be given to setting aside certain reasonably accessible areas for the extension of permanent peasant cultivation. As for demarcation, cairns of large stones on all footpaths, stream banks and main ridges, as recommended for other islands, might have to suffice to start with.

(III) The two District Officers, one of whom lives at Portsmouth and the other at Grand Bay, might be nominated as the local Forces Officers to work in conjunction with the trained Forest Officer whose appointment is recommended in the body of this report.

Since these officers would be the magistrates who would have to try forest cases, perhaps the power to offer to compound offences under the Ordinance should rest with the Administrator.

IV. To start with, each District Officer should be given one wholetime Forest Guard, who would wear a khaki uniform and receive a salary slightly higher than a labourer's wage, and one Forest Watcher who would patrol with the Forest Guard.

109. During my tour of the West Indies I have noticed that in some island in which the opportunities for practising the pernicious system of shifting cultivation are less than in others, the peasants seem to have made considerable progress towards adopting a more civilized form of agriculture for raising their provision crops. It is suggested that much might be done both in schools and by the Agricultural Department towards teaching the people to practise a more permanent sort of agriculture than they attempt at present and that more stress should be laid upon this form of education than upon such things as banana growing which seem to involve the destruction of forest.

110. During my stay at Roseau I was given an opportunity of meeting the Agricultural Advisory Committee, Members of the Executive and Legislative Councils and leading planters and was permitted to give an address on forest matters.

(*Signed*) A. WIMBUSH,
Chief Conservator of Forests, Madras.

21st March, 1936.

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